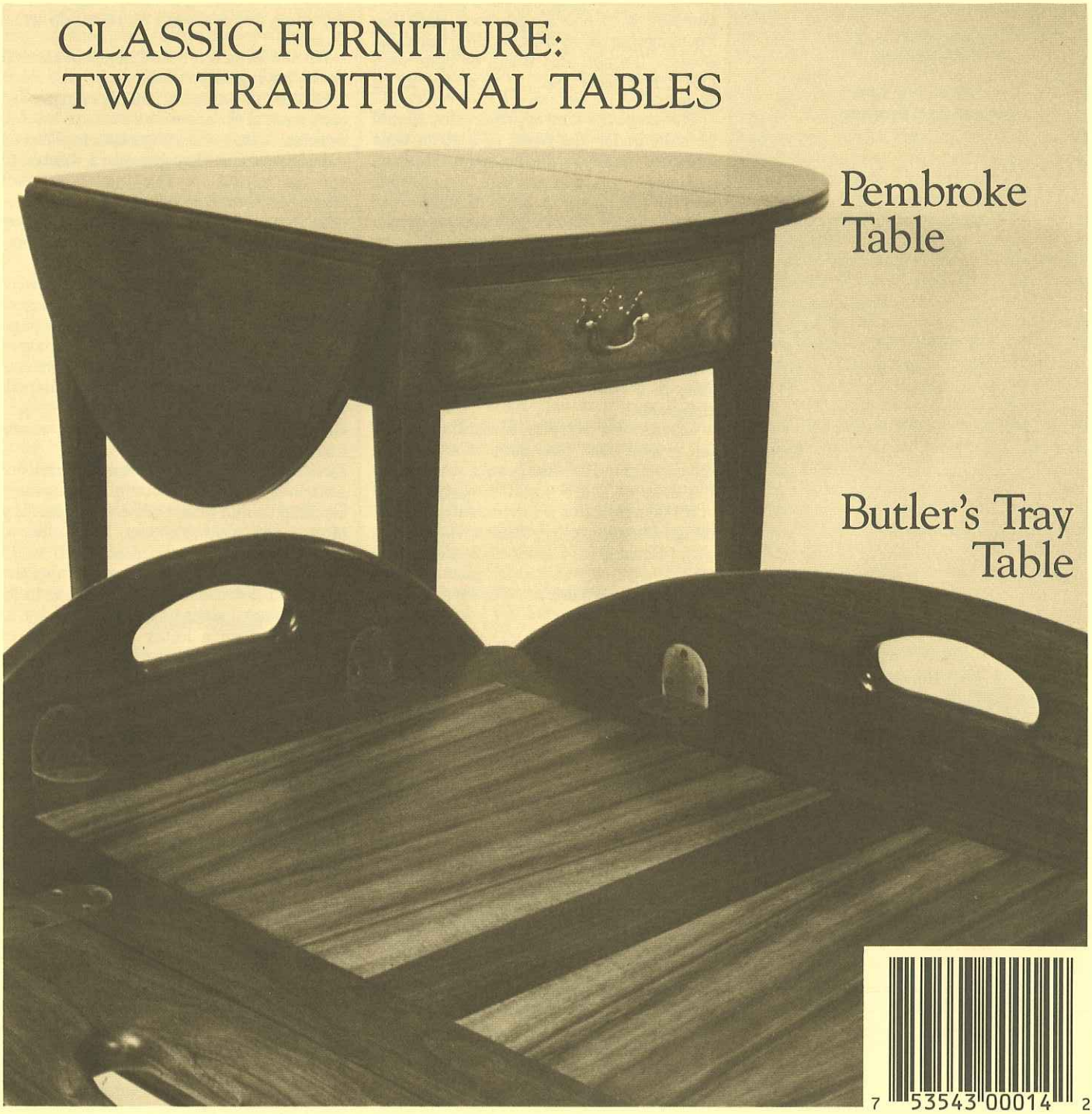
NUMBER FOURTEEN NOTES FROM THE SHOP

Woodsmith™

CLASSIC FURNITURE: TWO TRADITIONAL TABLES



Pembroke Table

Butler's Tray Table

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Woodsmith

Number Fourteen March, 1981

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Talking Shop

ABOUT THIS ISSUE

The Pembroke table shown in this issue is the calibre of furniture that can only be built in a professional furniture shop equipped with very large, very expensive machinery, or by a skilled craftsman with years of experience under his belt.

Baloney. All you have to do is replace all that expensive equipment and years of experience with one simple tool: patience. I'm not going to say that building this table is easy. It's not. But it can be done with just a few tools and . . . a whole lot of patience.

This is not the kind of project that should be built under the cloud of a strict time schedule. And you don't need a lot of experience or years of practice to do the job well. In most cases, a piece of scrap wood will supply all the practice you need.

In fact, I don't like to use the word practice. It always seems to imply wasted effort: time and materials wasted in an effort to learn how to do something.

I much prefer the word (and the idea) patience. It seems more appropriate to woodworking, especially woodworking done in a home shop for relaxation and enjoyment.

Whenever I'm trying something new, I tell myself that I've done it a hundred times before. It's just been a while since I've done it, and I'm a little rusty.

If I take my time, if I'm patient and think things through, everything will turn out okay. Besides, if I blow it, I can always say, "Well, that was just for practice, with a little more experience I'll have it down pat."

NOTES AND THOUGHTS

SCRAPER BLADE My father has told me stories about my grandfather coming home from work and complaining about spending the whole day scraping. I suppose most woodworkers and carpenters today wouldn't know what he was talking about.

Scraping is what everybody used to complain about before they started complaining about sanding. With the advent of sandpaper and electric sanding machines the use of scraper blades has been virtually eliminated. Which is really too bad, because a scraper blade does a better job — especially for finish work.

You might be able to find scraper blades in an old line hardware store. *Stanley* still makes a 3" x 5" scraper, but they call it a Refinishing Scraper (No. 28-035) and say it's used for removing paint and floor wax. They don't even mention the woodworking applications.

Woodcraft Supply (phone 800-225-1153 for catalog) lists a *Sandvik* scraper blade (made in Sweden). This one is a little longer and narrower (about 2½" x 6") than the *Stanley* but does the same job. I recently bought a new Sandvik and on the back of the plastic pouch it comes in was a diagram indicating that you shouldn't push it away from you as you're scraping. I really don't know why they say this. I've always used a scraper either way pushing or pulling and it always seems to do what I want.

No matter how it's used, a scraper is well worth having in your shop.

TIPS AND TECHNIQUES Usually on page 3 of each issue of *Woodsmith* we have a column devoted to tips sent in by readers. We ran out of space this time because I wanted to run the article on drawing the elipse. However, we will have the Tips page in the next issue. If you have a tip or technique that would be suitable for this column, please send it in. Thanks.

BACK ISSUES Again, because of a lack of space we had to eliminate the listing of back issues that usually appears on page 16. Soon (I hope) we will be running a complete index of information that has appeared in *Woodsmith* to date. This will be a much more extensive listing and should make information in past issues much easier to find.

LETTERS I do my best to answer all letters sent in by readers. But the letters keep stacking up and I can't seem to keep on top of my letter writing chores. I don't like to complain, but Ted and I work 10 to 12 hours a day, seven days a week. I enjoy the work, but it doesn't allow much time to do all the things I want to do (or should do). If you've written a letter and haven't received a response, you will . . . someday.

WHERE'S MY ISSUE? For the past two issues we've been a little tardy in getting the issue in the mail on time. A lot of this is our fault, everything just takes longer than we think it should. But then, sometimes there are other problems.

I'm usually not superstitious, but *Woodsmith* Number Thirteen had more than it's share of problems. First we were late. Then as soon as the issue got on the press, the press broke down. Then when it went to be stitched (bound) and trimmed, that machine broke down. Then just as it was about to be mailed, we realized someone forgot to drill the three holes in it. Then we ran into a bunch of holidays. The result: we were almost two and a half weeks late.

This current issue will probably be about a week late. But, I hope, the next one will be on time. With that in mind:

NEXT MAILING: May 4, 1981

Drawing an Elipse

THREE METHODS FOR MAKING THE ELIPSE YOU NEED

Both of the tables shown in this issue have oval (elipitical) tops. Drawing an elipse is one thing, but drawing it to a specific size and shape presents some problems.

The basic procedure for drawing any elipse is to first draw two perpendicular lines, Fig. 1. Along the horizontal line (major axis) mark two points (A and B) at the longest dimension of the elipse you want to draw. Along the vertical line (minor axis) mark two more points (C and D) corresponding to the short dimension (width).

Now you have to locate two focal points. Use a ruler or compass to mark off one-half the *length* of the elipse (from the center to Point A).

Again, use a compass or ruler to mark this distance from Point C to where it intersects on the major axis (Points F and F'). These are the focal points.

Drive brads at the two focal points, and temporarily drive another brad at Point C. In most cases a string can be used to draw the elipse, but we found that the string stretched too much with a large elipse, so we switched to very thin (32 gauge) wire.

Run out enough wire (string) to stretch a triangle around the two focal points and Point C. Twist the wire tight.

Loop a pencil inside the wire and start tracing the elipse. The pencil should cross through Points B, D, and A. That's all there is to it . . . except. In order to get an elipse the size and shape you need for the Butler's Table and Pembroke Table, you have to do a little more work.

ELIPSE FOR THE PEMBROKE TABLE

Before you can draw the elipse for the table top, you should first build the base. Measure the maximum width and length of the base, from outside to outside of the legs. (This should be 16¾" x 22¾".) Draw this rectangle on a piece of poster board or plywood, see Fig. 2.

Before you can draw the elipse, you must determine two things: The maximum width of the top, and the maximum width of each leaf.

We decided the top should extend ⅞" from each side, so the maximum width is 18½". Then we set the maximum width of both leaves at 9¾" (this is arbitrary).

Now in order to determine the total length of the elipse (which is the width of the top when the leaves are up), add the width of the top (18½") to the width of both leaves (9¾"). This equals 38". However, the leaves overlap the top ½" (because of the drop leaf joint). So, subtract a total of 1" from the 38", equaling 37". This is the maximum length of the elipse you want to draw.

Finally, you can proceed to draw an elipse as described above. Draw the two perpendicular lines through the outline of the base. Mark points A and B 37" apart, and mark points C and D where the minor axis intersects with the outline of the base. Locate the two focal points by measuring 18½" from Point C.

You will see that the elipse does not enclose the corners of the base, it's just inside them. What you want is an elipse that goes ½" to the outside of the corners. So, you have to do some adjusting.

Points C and D must be moved out enough so the elipse passes ½" out from the corners of the base. If you move Points C and D out another 2" you'll get the right elipse. (We arrived at 2" by trial and error.) When you do this, you must also relocate the two focal points (measuring 18½" from the new Point C). Move the brads, adjust the length of the wire and draw a new elipse.

This one should be just right. You can now cut around it's perimeter and use this pattern to mark the stock for cutting.

ELIPSE FOR THE BUTLER'S TABLE

Drawing the elipse for the Butler's Table involves a different set of problems. What you want to get is an elipse drawn around the frame so, 1) it touches each of the four corners, and 2) so the maximum distance from the edge of the frame to the elipse is equal on all four sides.

The first step is to draw the outline of the web frame (tray) and then draw an elipse on the *inside* of the frame so it touches the center point of each side. But what you want is an elipse scribed on the *outside* so it touches each of the four corners.

It would seem to make sense to lengthen the wire so it reaches to the corners of the frame. But that doesn't work. To get a true concentric elipse (one that's the *same shape* as the first one, but bigger), you have to change the focal points.

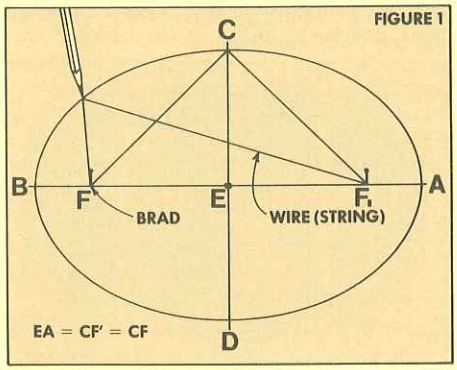
What we did is find the shortest distance between one corner of the tray (Point M) to the elipse (Point N). It turned out to be 4½". Then we marked new positions for all four points (A, B, C and D) 4½" out from their original positions.

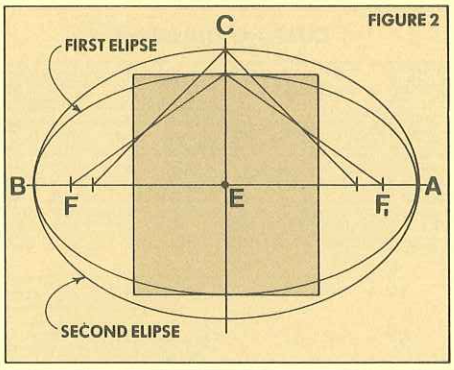
To find the new focal points, measure between the center (Point E) to the new Point A. (This should be 23".) Mark off this distance from Point C to get the new focal points. Drive brads at these new points and adjust the wire (string) so it reaches the *outside corner of the web frame*, Point M.

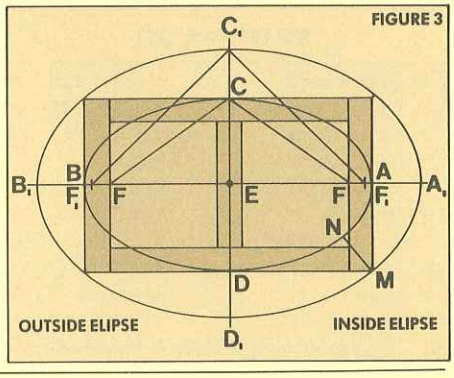
Now you can draw a new elipse that should touch each corner of the frame. And the final test: the maximum width of each leaf should be 4½". These leaves can now be cut out and used to trace the outline on the stock to be used.

HELP!

Okay, you've run out of aspirin and you'd rather just trace a pattern for each elipse. We've printed up some patterns that can be used to trace each elipse. The same pattern is suitable for either the Pembroke Table or the Butler's Table. (It just kind of worked out that way . . . really.) If you like one, send $2 to Woodsmith and ask for Pattern BTP.



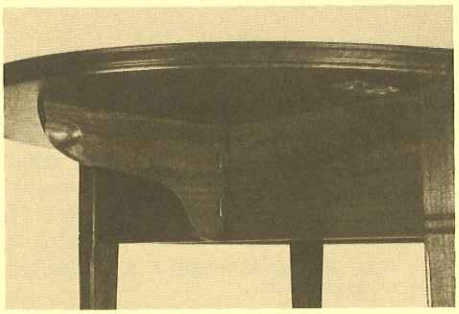


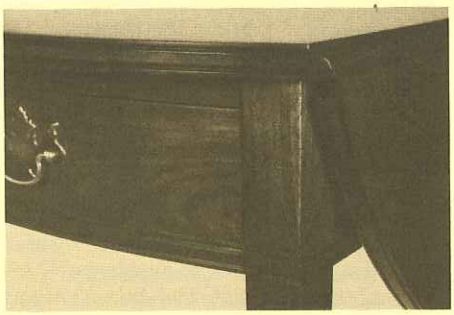


Pembroke Table

A TABLE COMMISSIONED BY LADY PEMBROKE







Back in the Eighteenth Century, Lady Pembroke decided she needed another table. Nothing big and ornate. Just a small, but elegant side table. When the table arrived it had an oval drop-leaf top, a single drawer, and straight (not turned) legs. Needless to say, she was delighted. And to this day, the table that bears the Lady's name is a classic piece of traditional furniture.

Pembroke tables are (by tradition) built of Mahogany or Walnut. We chose Walnut. The three basic requisites of the design (an oval top, single drawer, and straight legs) make it a Pembroke. From there we proportioned the table to meet certain requirements we had for buying and cutting the wood . . . yet remain true to the design.

GETTING STARTED

An oversimplified view of the construction of this table involves building the base, then cutting out the top, and finally joining the two together. Of course, things are not quite that simple. There are some aspects of building this table that require a good measure of patience. But I honestly believe that this is a fine piece of traditional furniture that can be built by anyone willing to tackle it.

The initial step, of course, is buying the wood. The Cutting Diagram, below, shows how we laid out most of the pieces for the table from seven pieces of walnut, ¾" x 5½"-48". Also, a 48" length of 8/4 stock is needed for the legs, and a 48" length of ½" stock is used for the leaf supports.

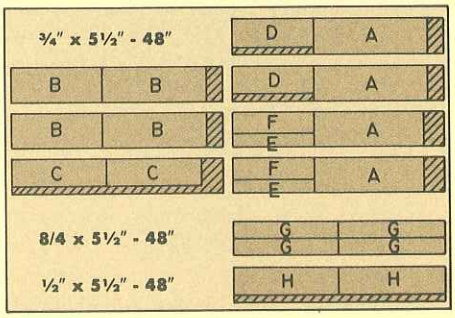
I should mention here that hardwood can be sold at an actual thickness of 13/16", or 25/32", or ¾" even. The walnut we bought was planed to 25/32", but we've given all the dimensions at ¾" just to (hopefully) simplify things.

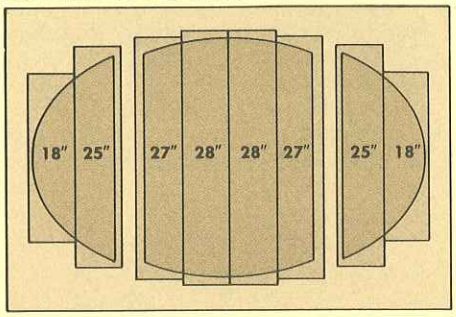
From the ¾" stock, select the best pieces for the table top. These can be cut, matched for grain pattern, and glued up as shown in the drawing below. We did this first in order to give the glue time to dry. Then we started in on the base.

MATERIALS LIST

A	Boards for Top	¾ x 5½ - 28
B	Boards for Leaf	¾ x 5½ - 25
C	Side Aprons	¾ x 4¾ - 21
D	Back Apron	¾ 4¾ - 15
D	False Apron	¾ x 4¾ - 13½
E	Drawer Rail	¾ x 2¼ - 15
F	Drawer Front	¾ x 3 3/16" - 13½
F	False Drw. Frnt.	¾ x 3 3/16" - 13½
G	Legs	1⅝ x 1⅝ - 23⅞
H	Leaf Support	½ x 4¾ - 19½
I	Drawer Sides and Back: cut as needed.	

CUTTING DIAGRAM





THE LEGS AND APRONS

First, we cut the legs from the 8/4 stock (8/4 stock is 1¾" thick actual), getting four leg blanks 1⅝" square by 23⅞" long. Then we cut slot mortises in the legs for the side and back aprons, and twin mortises for the front drawer rails.

(Complete information for cutting these mortise and tenon joints is given in *Woodsmith* Numbers Eight, Twelve and Thirteen.)

To some extent the position of the mortises depends on the actual thickness of the stock you're using. The side aprons are the most critical. The apron must be positioned to allow enough room for the ½"-thick leaf support, which is added later. (When it is added, there should be enough room so it is set in ⅛" from the outside of the leg. This can be seen in the detail photo on the previous page.)

Now, back to the legs. Once the position of all the mortises is determined, you can go ahead and cut them. Figure 1 shows the position of the mortises we used on our table. The next step is to taper the legs. The taper should start 5¼" down from the top of the leg (Detail A), and end so it takes off ⅜" on each side, Detail B. This translates to a taper of 1° of ¼" per foot.

The tenons in the aprons and rails are then cut to fit the mortises in the legs. Careful attention should be paid to the shoulder to shoulder distance between the tenons (see Fig. 2). This distance will determine the size of the base.

A groove must be cut on the inside face of the side aprons. This groove (which is detailed in Fig. 7) is used to attach the table top hold-downs.

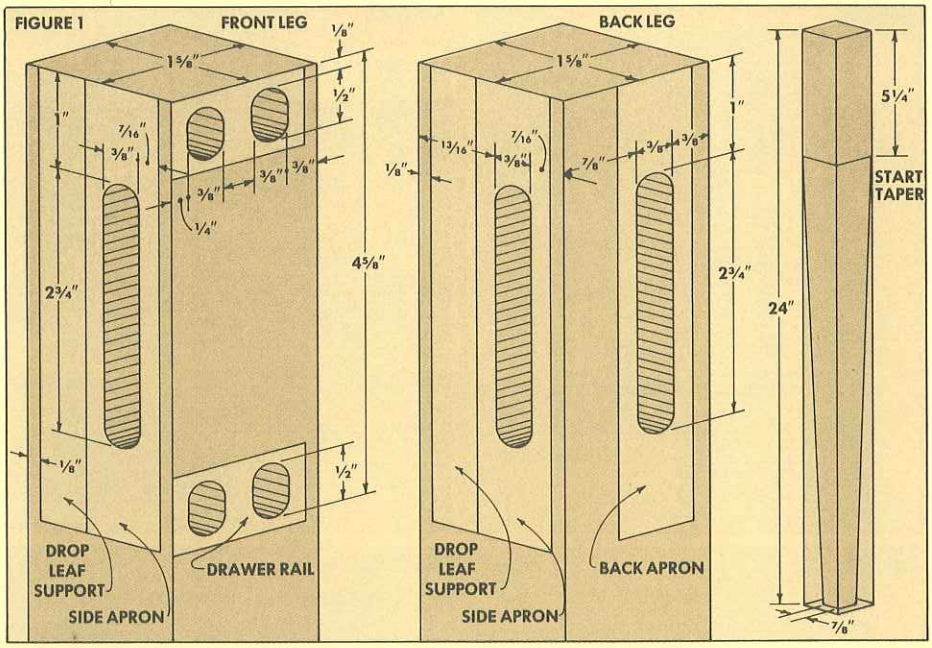
Note that the tenons are cut in the drawer rails before the curve is cut on the front edge. This curve must duplicate the curve on the 'false' front of the drawer. The 'false' drawer front, as well as the 'false' piece on the back apron are gently curved to (almost) match the curve of the table top. The process is the same for both pieces.

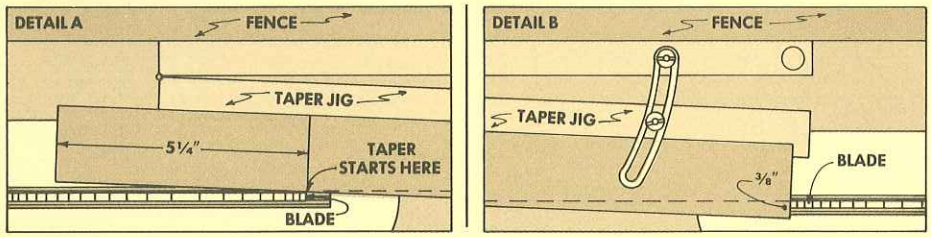
First screw the 'false' piece to the apron or the back piece for the drawer front. Sketch a gentle curve (just freehand it) on the 'false' piece, leaving a strong 1/16" at the ends. Then when attaching it, be very careful to position the woodscrews so they won't poke through when the curve is cut, see Fig. 3.

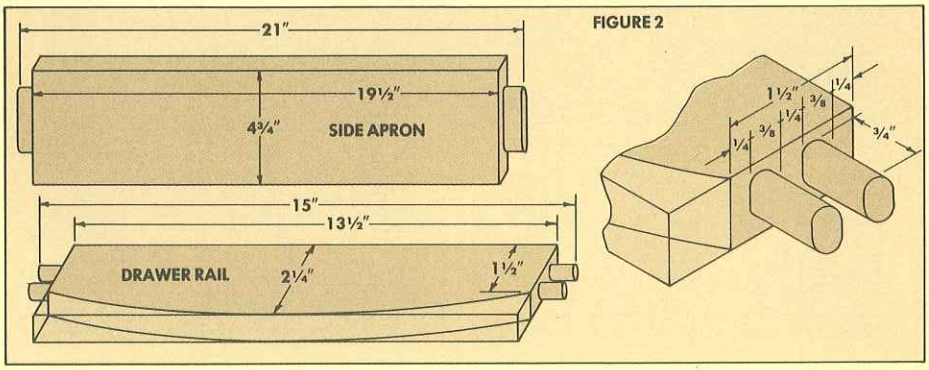
When both pieces are joined together it's much easier to hold them steady when cutting the curve. This curve is roughed out on a band saw (Detail C) and then finished with a spokeshave (Detail D).

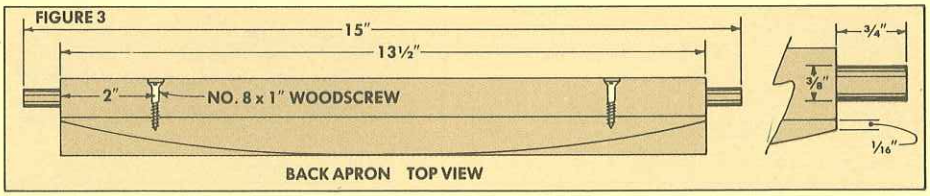
When the drawer front is finished it can be used as a template to duplicate the curve on the drawer rails.

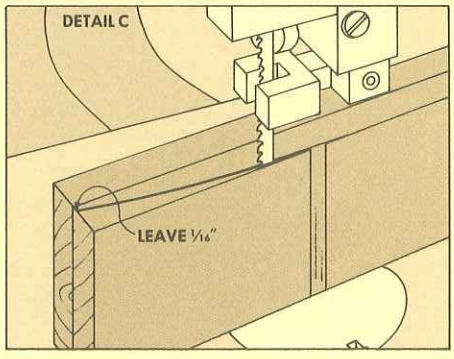
At this point all the major pieces for the base are cut. Go ahead and dry assemble the base to check it out.

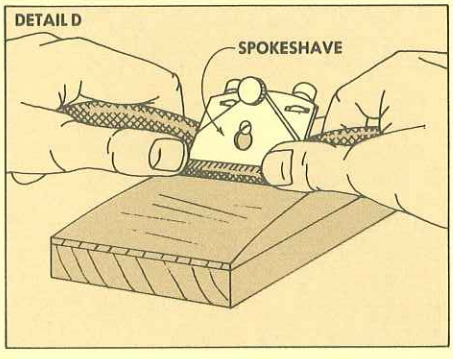


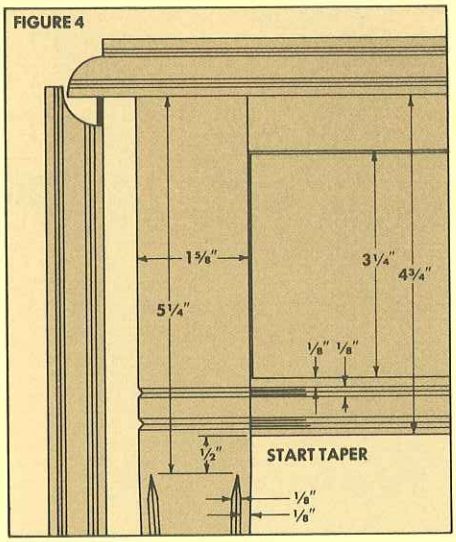


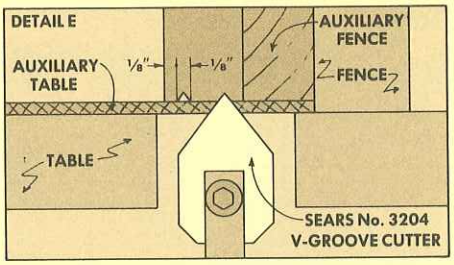


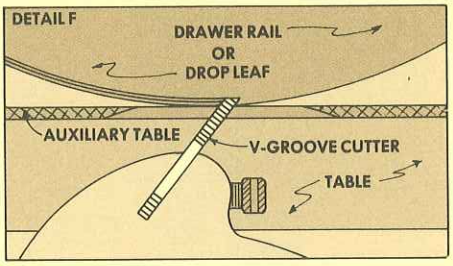


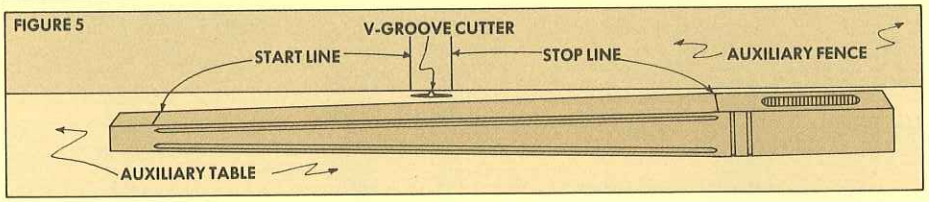


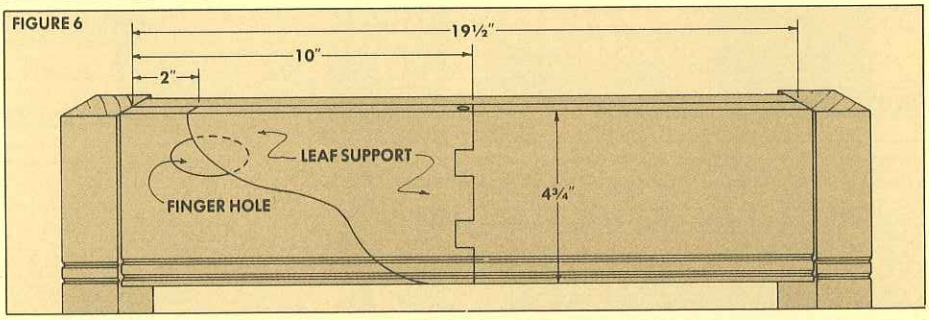


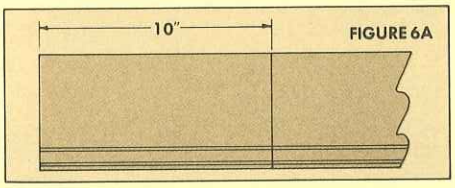


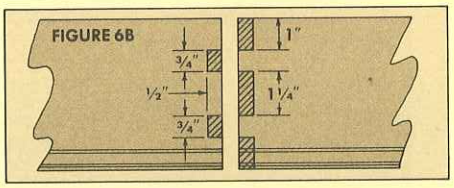


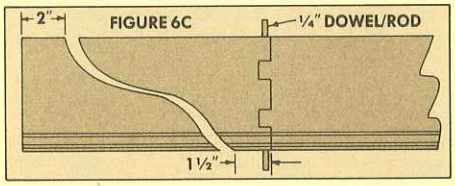


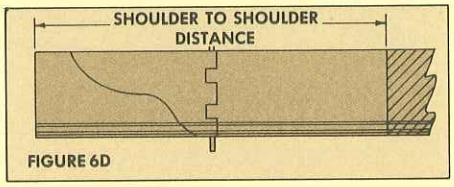


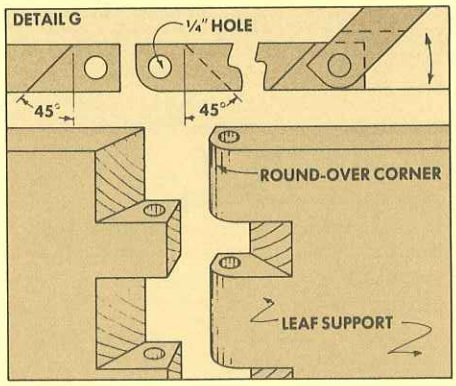


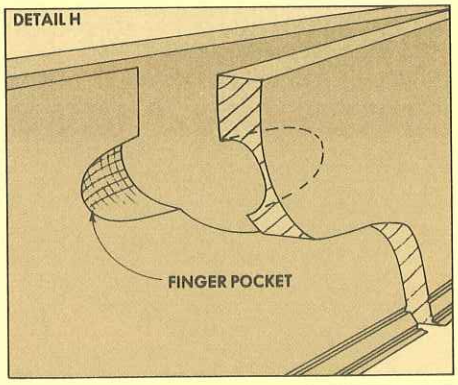












CUTTING THE V-GROOVES

Classic Pembroke Tables have handsome inlays on the legs, drawer, and top. However, on Pembrokes of more recent vintage a simple V-groove usually replaces the string inlays. We opted for this style.

Before cutting the V-grooves in the legs and drawer rail, cut the ½" stock for the leaf support to final width (matching the side aprons) and approximate length (leaving it about 3" longer than the distance between the legs.)

To cut the V-grooves, we set up the table saw as shown in Detail E. We added an auxiliary table (a piece of ¼" Masonite) to cover the slot in the table insert. (This is necessary to support the curved edge of the drawer rail, and later the oval top.) Clamp the Masonite to the table, turn on the saw, and very slowly raise the cutter until it pokes through about ⅛". Stop the saw and adjust the height of cut to exactly ⅛". (Trial cuts on a piece of scrap will insure an accurate setting.)

The first V-groove cuts are made on the curved edge of the bottom drawer rail (Detail F), spacing the cuts as shown in Fig. 4. Then mount this rail between the front legs and mark the position of the horizontal V-grooves on the legs. Finally, cut the V-grooves in the ½" stock for the leaf support so they, in turn, match the legs.

Before cutting the V-grooves in the tapered part of the legs, sand or scrape off any saw marks. The grooves on the tapered face of the legs are stopped 1½" from the bottom and 5½" from the top of the legs. Notes: 1) When cutting these grooves, mark lines on the leg and the auxiliary fence to indicate the start and stop points, Fig. 5. 2) V-grooves are cut on the two outside faces of the legs only, the two inside faces are left plain. 3) One cut on each face of the leg can be made by starting near the bottom of the leg and moving toward the top. For the second cut, flip the leg end for end and start the cut near the top, moving toward the bottom. 4) One way to check that you're cutting on the correct face of the leg is that a mortised side will always be up.

THE LEAF SUPPORT

Now we get to the fun part . . . the leaf support. Every Pembroke table you'll ever see always has the leaves hanging down at the sides. They're almost never raised up. Yet, you still have to provide some way to support the leaves whenever there's a Blue Moon and you want them up. This is not an easy task.

The final dimensions of this support are shown in Fig. 6. The ½" stock you start with should be at least 22" long. (The V-grooves have already been cut along the bottom edge.)

The first step is to cut off a piece 10" long.

This will be the piece toward the front of the table. Cut two notches in this piece ¾" wide and ½" deep, Fig. 6A.

The second piece (which will go toward the back of the tble) is not cut to length yet, but go ahead and cut the matching pins, Fig. 6B. Join these two pieces together and carefully drill a ¼" hole through the joint. (We drilled halfway down from the top, then halfway up from the bottom.) A ¼" dowel or ¼" steel rod can be used for the hinge pin.

Now go ahead and draw the gentle ogee curve on the front piece, Fig. 6C. (Just freehand a curve that looks right to you.) Now you can measure the distance between the legs and trim the back piece to length to fit between the legs.

Finishing up the knuckle joint requires a little hand work. Detail G shows a view from the back of the hinge. All of the notches are chiseled out at a 45° angle, and the back edge of the swing out part of the support is rounded over to clear the apron. This method of making the hinge leaves a flat, almost continuous surface; in effect, concealing the hinge when the leaf support is closed.

Detail H shows the finger pocket. This must be carefully carved out with a gouge, just enough so you can get your finger in there to swing it in position.

Finally, this whole assembly can be finish sanded and fastened to the apron. It's a good idea to fasten it with woodscrews in case the hinge breaks and you have to replace it. Do not use glue.

All of the pieces for the base have now been completed (except for the drawer). Go ahead and finish sand all pieces and then assemble the base.

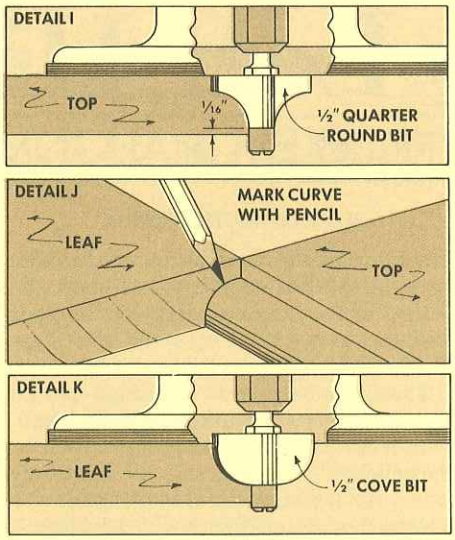
THE OVAL TOP

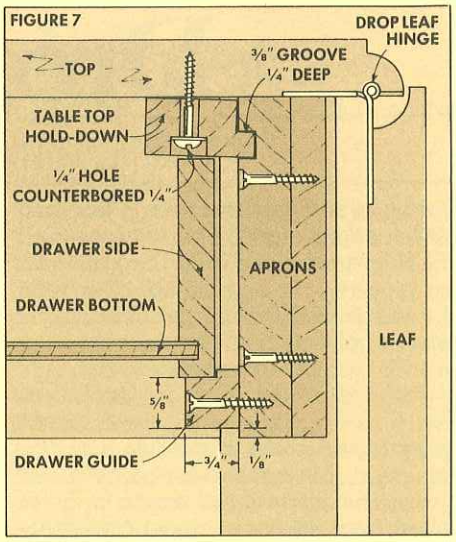
Once the base has been assembled, measure the outside to outside distance between the legs. (This should be 16¾" x 22¾".) A rectangle this size can now be drawn on a piece of poster board as the first step in drawing the elipse for the top.

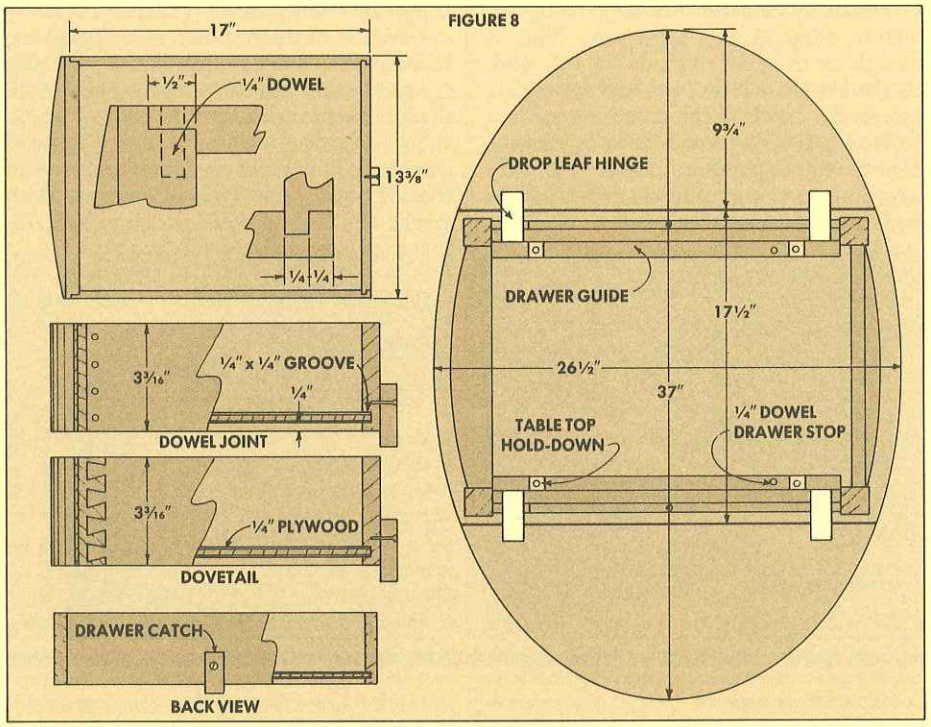
Drawing this elipse requires a somewhat lengthy explanation, so we've put this information on a separate page, see page 3. After you've made the elipse template, you must cut the rule joints (drop leaf joints) on the top and leaves. This must be done *before* the elipse can be traced.

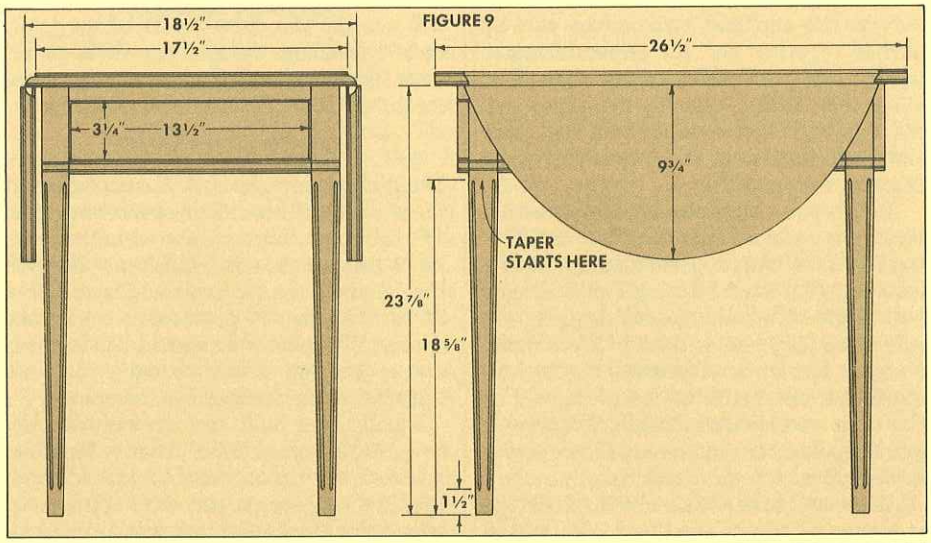
At the beginning of this article I mentioned that we glued up the pieces for the top and leaves. These pieces must now be smoothed down, getting them at least close to a table top surface.

When the top and leaves are smooth, cut a good square edge where the rule joints are going to be cut. Then we used a router with a ½" quarter-round bit to cut half of the joint on both edges of the top, Detail I. Mark the outline of this curve on the leaf side (Detail J) and cut the cove half of the









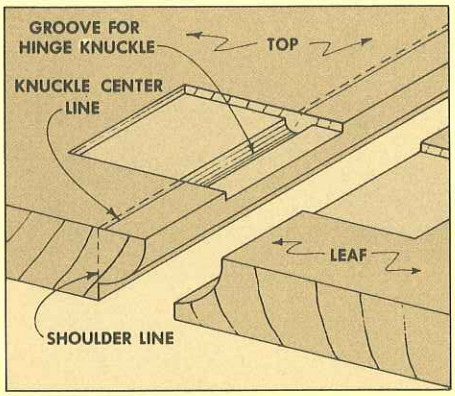
Drop-Leaf Hinges

THE PROBLEM IS ALIGNMENT

Cutting a rule joint for a drop leaf table presents some problems . . . especially if the hinge is mortised in. If the joint is not cut properly, the mortise will show when the leaf is in the down position. So, the joint must be cut, and the hinge mounted, in such a way to cover this mortise.

For the Pembroke table in this issue we used a router with a ½" quarter-round bit to cut the table side of the rule joint. The thing to keep in mind when making this cut is that the depth of cut should be determined from the *bottom* side of the table. You must leave a 1/16" flat edge along the bottom edge of the table top. This is enough for the pilot to guide the bit. And, it's also the thickness of the hinge, which in turn is the depth of the mortise.

The depth of the shoulder along the top edge is not important, and it will vary according to the overall thickness of the wood you're using.



MOUNTING THE HINGE

When the rule joint is cut, push the table top and the leaf together and mark the outline of the hinge. A drop leaf hinge is designed with a long flap and a short flap. The long flap goes on the leaf side.

The basic outline of the hinge can be chiseled out to the thickness of the hinge. Then a small groove must be carved out for the knuckle. Allow yourself a little latitude here so final placement of the hinge can be done without interference. (It's best to test things out on a piece of scrap.)

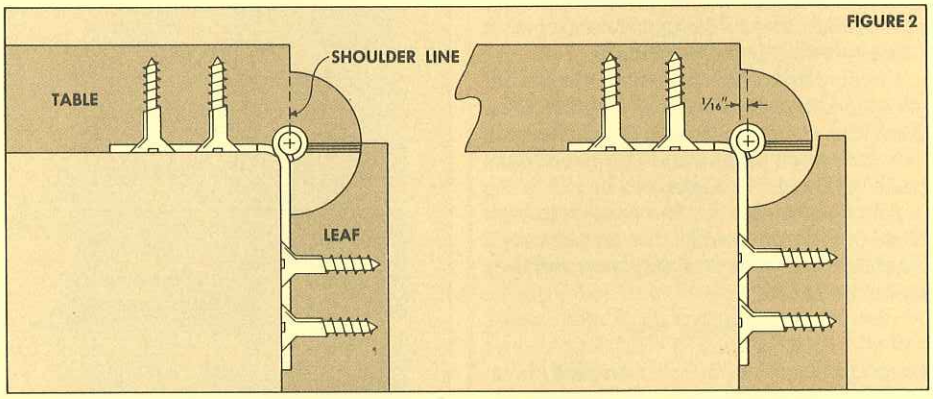
Once the mortise is cut, use a try square to mark the shoulder line on the end, continuing it onto the bottom of the table top. (This is shown as the dotted line in Fig. 1).

The drawing on the left in Figure 2 shows the knuckle of the hinge centered on the shoulder line. This placement won't work. The leaf will bind as it's raised. Instead, you have to move the knuckle toward the leaf side to prevent binding.

In doing this you solve one problem and create another. As shown in the drawing on the right in Figure 2, the knuckle of the hinge has been moved about 1/16" to the leaf side. What this does, in effect, is raise the position of the leaf just a tiny bit so the shoulder covers the mortise. That's good. However, if the knuckle is moved too far to the leaf side, there will be a big gap between the top and the leaf. That's bad.

All you can really do is experiment a little to find the happy medium between too far and not far enough. But that's part of the fun of woodworking.

Sources: *The Woodworkers' Store* Catalog lists Table Hinge (D4180). *Craftsman Wood Service* Catalog lists Table Leaf Hinges (H2415, H2416, H2417). The *Woodcraft Supply* Catalog has solid brass Table Hinges (16R41-PH).



Continued from page 7.

joint on each leaf (Detail K).

Now the top and two leaves can be pushed together and the elipse template used to mark the outline of the elipse. Cut along this outline, smooth the edges (we did this with a disk sander on the table saw), and finally cut the V-grooves in the edge as shown in Fig. 4.

At this point we finished the top with a hand plane and scraper until it was tabletop flat. Then the drop leaf hinges could be installed. We used *Stanley* Table Hinges No. 46-3300. These hinges are designed for rule (drop leaf) joints. Back in *Woodsmith* Number Eleven we discussed the technique for surface mounting these hinges. For this table we mortised them in. The technique is similar, but alignment of the hinge is more critical when it's mortised in.

As shown in the article above, the hinge is placed a little to the "leaf side" of the shoulder line. The farther the knuckle is moved toward the leaf, the more the leaf will overlap the curved part of the joint, thus concealing the mortise. This placement is tricky and experiment on some scrap will show you the best position.

OTHER LITTLE STUFF

The table is now about 90% complete. But there's a lot of other little stuff to be done. The table top must be secured to the base. To do this we cut small blocks as shown in Fig. 7 to hold the top in place. These blocks fit in the grooves previously cut in the aprons. The pilot hole should be cut oversize so the top is free to move (expand/contract) with changes in atmosphere.

Finally, we built the drawer. We removed the curved 'false' front (which was just screwed in place). We cut the sides and back for the drawer out of ½" birch, and joined the drawer with dovetails.

It seems only right to use dovetails on a table of this calibre. But we have diagramed an optional approach which is much easier. Just cut a rabbet in the drawer front and join the sides with a series of four or five dowel pins. This method provides a somewhat decorative appearance and is plenty strong enough.

The final step of course is applying the finish. If you think building the table took a long time, the finishing will take almost twice as long. The finishing technique we used is described on page 9.

This technique involves applying several coats of sealer to the entire table, followed by two coats of varnish. However, we applied the varnish only to the top, not the base. The base doesn't really need the protection of the varnish, the sealer is enough. Then the whole table was rubbed out with pumice stone and oil to give it a rich satin sheen.

Finishing Techniques

HOW TO GET A HAND-RUBBED SATIN SHEEN

Here's the goal: finish a table top to a rich, lustrous, hand-rubbed, satin sheen — the kind of finish you want to touch with your fingertips just to make sure it's real. It can be done in a home shop, but it takes a lot of work, and even more patience.

The first step in producing that kind of finish is to get the table top as smooth as possible. There are two approaches: with power tools or with hand tools.

The power tool approach involves using a belt sander to get the surface roughed down. I would recommend an 80-grit belt to start with. Hold the sander at a slight angle to the grain and smooth down any difference between the edges of the boards. Then sand with the grain, moving the sander up and back being careful not to tip it on edge.

After the top is roughed down with the 80-grit belt, switch to a 100 or 120-grit belt. Then final sanding can be done with a *Rockwell Sped Bloc* sander. (I use 100-grit Garnet paper.) Any swirl marks should then be sanded out by hand.

It may seem like a contradiction, but a good jack plane (14" long) will do the job faster and easier. The one I use is a *Record* corrugated bottom jack plane. It's expensive, but it's worth every penny. After planing, the top can be smoothed to perfection with a hand scraper blade.

APPLYING THE FINISH

The table top is smooth and ready for the finish. Now all you have to do is make one choice . . . between 100 ways to go.

What follows is just one of those ways. It's the finishing technique we used on the Pembroke and Butler's tables shown in this issue. The basic procedure is to apply stain (if you want to), then several coats of sealer, and finally the varnish.

All of these things are chemicals and are, to one degree or another, *not* compatable with each other. It's best to choose one family (brand) for all three steps. This time I chose *Pratt & Lambert* products. They offer a wide range of finishing products: paste filler, sealer/filler, sealer, stains, varnish, spar varnish, polyurethane, etc.

If the top is made up of boards of slightly different colors, you'll probably want to apply a stain to even things out. We decided to apply stain to the Pembroke table, but leave the Butler's table natural.

Before proceeding any farther, sweep the shop clean of all sawdust. Then wait a day for the dust to settle before applying the sealer. Set up a finishing area with good ventilation, but free of drafts.

THE SEALER COATS

Both of the tables we finished are walnut. It's usually recommended that you apply a paste filler to open grained woods like walnut. To be honest, I'm not particularly fond of working with paste fillers. They're a mess. Besides, three coats of sanding sealer does the job nicely.

Most sanding sealers are formulated for use with lacquer finishes. The *Pratt & Lambert* Sanding Sealer H40 is formulated for use with varnish. This is where sticking with the same brand is important.

To apply the sanding sealer, I used one of those new-fangled foam polybrushes, brushing it on as with any other finish. I know you're supposed to spend a lot of money on natural bristle brushes. But these little things seem to do a better job, and they only cost about 40¢. I think they're a good deal.

As you apply the sanding sealer, watch for drips and runs. If there's a run, dip the brush in some mineral spirits and brush it out.

It will take several hours for the sealer to dry, depending on how thick the coat is, the temperature, and the humidity. When it is dry, use 400-grit silicon carbide paper to sand out the roughness. As you start to sand, you should get a very fine white powder. If, instead, the sealer gums up on the paper, it means it's not dry yet.

Apply another coat of sealer. After this coat is dry hold the table top at an angle under a fluorescent light. Look closely at the surface. If you see little pockets (pores), it means the grain isn't filled yet, and one more coat is needed.

VARNISH TOP COAT

When all the grain pores are filled, you can apply the varnish. Before you start, make sure the surface is clean of all dust — go over it thoroughly with a tack rag. The biggest problem with varnish is that it takes so long to dry. In order to dry properly, you need a good environment: room temperature between 70° and 80°, low humidity, good ventilation but no drafts.

During the drying time, the varnish is very susceptible to dust from the air. So, the finishing area must be dust-free. It's best to protect the table top with a piece of plywood right after you've applied the varnish.

Besides dust, the biggest enemy you have to face is bubbles. Do not shake the can of varnish, stir it gently. Load the brush with vanrish (fairly full, but not dripping) and spread it *across* the grain. Continue until the entire top is covered. Then "tip off" any brush marks by pulling the brush *with* the grain.

This coat of varnish will take forever to dry. Allow at least a day, maybe more. Test it by pressing your thumb on the surface. If a thumb print appears in the finish, it's not dry.

Before applying the second coat, the surface must be sanded smooth. Again, use 400-grit silicon carbide paper. Be very careful not to sand through the varnish, just take out the bumps.

HAND RUBBING

After the final coat of varnish is dry, the surface will probably look quite glossy, but uneven with some bumps of dust particles. What you want, of course, is a smooth, hand-rubbed satin sheen.

To get a hand rubbed finish you need three things: pumice stone, rubbing oil and a felt pad. Pumice stone is a very fine abrasive powder. It used to be available in a range of grits, but now is usually sold in one grit only: "FF" the medium grit.

Rubbing oil is a light oil that suspends the pumice stone so it can be worked over the surface of the finish. (Sources for these products are listed below.)

Soak the felt pad with some rubbing oil. Pour a little pumice stone in a small pan and dip the felt pad into it, or pour a little oil on the surface and sprinkle the pumice stone on top. Then start rubbing.

Rub with the grain in long even strokes. Don't try to overdo it, just rub with medium pressure until you feel the pumice stone start to cut. The more you rub, the shinier the finish becomes. (You don't want to rub too much or you'll go through the varnish.)

Every once in a while clean off the oil and pumice with a soft cloth to see what you've got. You can stop whenever you get the sheen you want. If you want more of a shine, switch to rottenstone and go through the same process.

When you're done, wipe off all the oil and abrasive powder. There will be a thin layer of oil left on the surface; it will dry out in a day or so. You can buff the top with a lamb's wool pad and leave it that way, or apply a paste wax.

Finally, run your finger tips across the top, just to make sure it's real.

Sources: Pumice stone, rubbing oil and rubbing felt is available from: *The Woodworkers' Store*, 21801 Industrial Blvd., Rogers, MN 55374, (612) 428-2199.

Butler's Tray Table

JEEVES, ANOTHER ROUND OF BRANDY PLEASE

Before you place a Help Wanted ad for a new butler, you should know there's one other expense involved in building this table...the hinges. The ones we used are made especially for mounting the leaves (handles) of a Butler's Tray Table. They're very nice, but they can be expensive. Since there are four pair, this can add somewhat to the cost of the project.

But, I suppose if you can afford a butler, the hinges are just another trivial expense.

Since I had to foot the bill for the hinges I decided to go all the way and build the table out of American black walnut. I started with the base.



THE BASE: LEGS & APRONS

The base is simple: four square legs connected with four aprons. To make the legs I started with a chunk of 8/4 stock. (8/4 stock is 1¾" thick actual, and the piece I used was 3½" wide. Since I had to allow for the kerf when ripping the legs, I made the final dimensions of the legs 1⅝" square.)

Before cutting the bead corners on the legs (this is the traditional style on Butler's tables) I went ahead and cut the four aprons to the 3" final width and to approximate length (allowing for the tenons).

As shown in Fig. 1C, I cut full-round bead corners on the three 'outside' corners of the legs. The fourth (inside) corner will be chamfered later, so no bead cut is needed. The set-up shown in Fig. 1B is for a table saw. (I used a Sears molding head and No. 2352 bead cutters.) An auxiliary (wood) fence must be attached to the regular fence so two of the coves are covered.

After cutting the bead corners on the legs I went ahead and cut a bead edge along the bottom edge of each of the four aprons.

JOINING THE APRONS

The only reason for cutting the beads first is so the aprons can be aligned properly. As shown in Fig. 1C, the face of the apron is positioned just behind the bead/groove.

The aprons are joined to the legs with a haunched mortise and tenon. I used a ⅜" router bit on a drill press to cut the slot mortises in the legs. Then the haunched tenons were cut on a table saw. The ends of the tenons are mitered to provide a little more gluing surface. (The procedure for cutting this joint is shown in detail in *Woodsmith* Numbers Eight and Thirteen.)

One note: when cutting the tenons on the aprons, make sure the distance between the shoulders is as shown in Fig. 2. The tray top is made to a precise size and the base must be this size for a proper fit.

Before gluing up the base, I went ahead and finish sanded all the parts. (It's much easier to do it now, especially the aprons, than after assembly.)

THE TRAY

The tray part of this table is just a rectangular web frame. This tray is not attached to the base, but simply rests on top (with two cleats to hold it in position).

The web frame goes together just like a door. Again, I used a haunched mortise and tenon to join the 'stiles' and 'rails'.

First, the slot mortises are cut, in the two end rails. A groove must be cut along the inside edges of the rails to accept the panel insert. When cutting this groove, I adjusted the table saw fence so the blade skimmed along one cheek of the mortise. Since all of the mortises are in the same position (hopefully) I made this same cut on both rails.

Then, without changing the fence, I made a similar cut in the two stiles (long pieces) and the middle rail. This assures that the grooves in all five pieces will line up. The fence can then be adjusted to skim along the other cheek of the mortise, repeating this cut on the other rails and the stiles. Finally, the tenons are cut in the two stiles and middle rail and the web frame can be dry-clamped and checked for square.

THE PANEL INSERTS

Unfortunately, there's no inexpensive way to get around making the panel inserts. You need less than two square feet of material, but it's difficult to buy an amount that small.

At first I was going to use walnut plywood for these inserts, but the smallest sheet I could buy was 2'x4'. (Solid wood cannot be used because of expansion/contraction problems.) Then I decided I'd like to try a relatively new product — *Pliant Wood* veneer. This is an extremely flexible, easy-to-use veneer that is applied with contact cement. It's incredibly easy to work with, and naturally, it's expensive.

I was able to buy *Pliant Wood* veneer in a 24" x 24" sheet (for this table I used Koa). The mail-order sources (listed below) sell a minimum size of 18" x 96". So, whether you choose plywood for the inserts or the *Pliant Wood*, you're going to have a lot left over (that hopefully can be used on another project).

If you choose plywood for the panels, rabbets must be cut on the top and bottom edges, forming a tongue to match the groove in the web frame. The panels must fit *exactly* in the openings. It's best to cut one panel and clamp it in the web frame. Then take measurements for the second panel, and cut it to fit.

The procedure for the *Pliant Wood* veneer is similar. First I mounted the veneer to a plywood base. Then I cut these panels to fit the openings. Note: Before cutting the panels, the web frame should be dry-clamped, smoothed and finish sanded. Then the rabbets can be cut so the panels are flush with the face (top) of the frame.

THE LEAVES/HANDLES

The web frame should be glued up before the leaves (handles) are cut. The four leaves are cut so (when they're in the down position) they form an elipse. But first the stock for the leaves should be planed to the same thickness as the web frame.

To get the elipitical shape, I followed the procedure shown on page 3 to draw an elipse so it intersects at the four corners of the web frame.

Then I cut out the curved leaves on a band saw, sanded the edges on a disk sander mounted on the table saw, and finally, rounded over the outside edges with a router using a ½" quarter-round bit.

The final step is to cut out the holes for the handles. First I marked the points for drilling two 1" diameter holes, Fig. 4. In order to mark the top edge of the handle hole, I used what was handy at the time — a rubber sanding block. It has a nicely curved top that was just the shape I needed. After the holes were drilled I finished cutting the handle hole with a sabre saw, smoothed it out with a file, and finally rounded the edges with a ⅜" quarter-round bit.

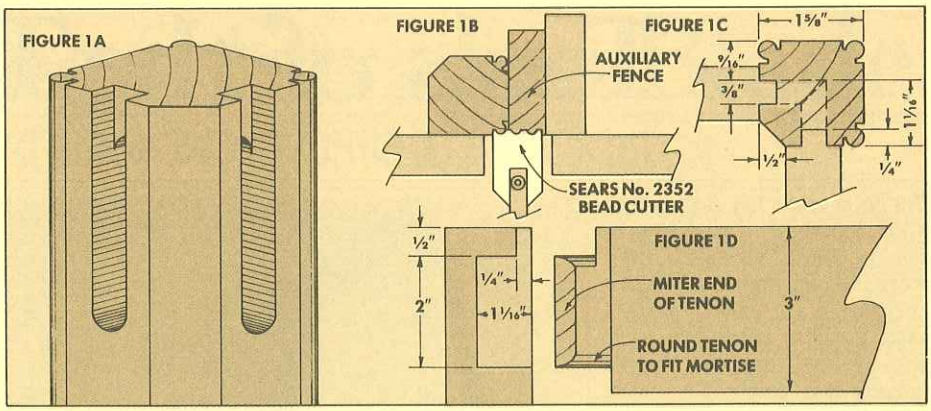
Now you're ready to mount the hinges. Since this turned out to be a good deal more difficult than I expected, we've put the information for cutting the mortises for the hinges on a separate page (see page 16). And the final step is to mount ½"-wide cleats under the tray to hold it in place.

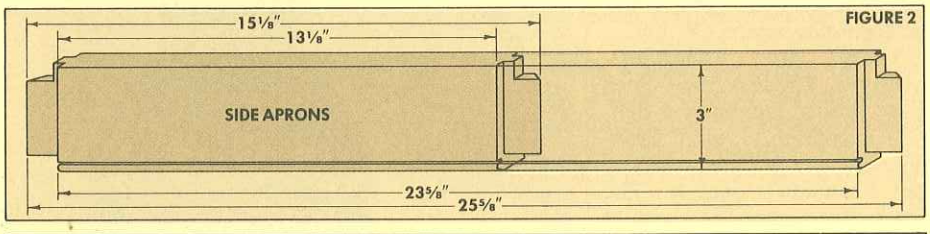
THE FINAL FINISH

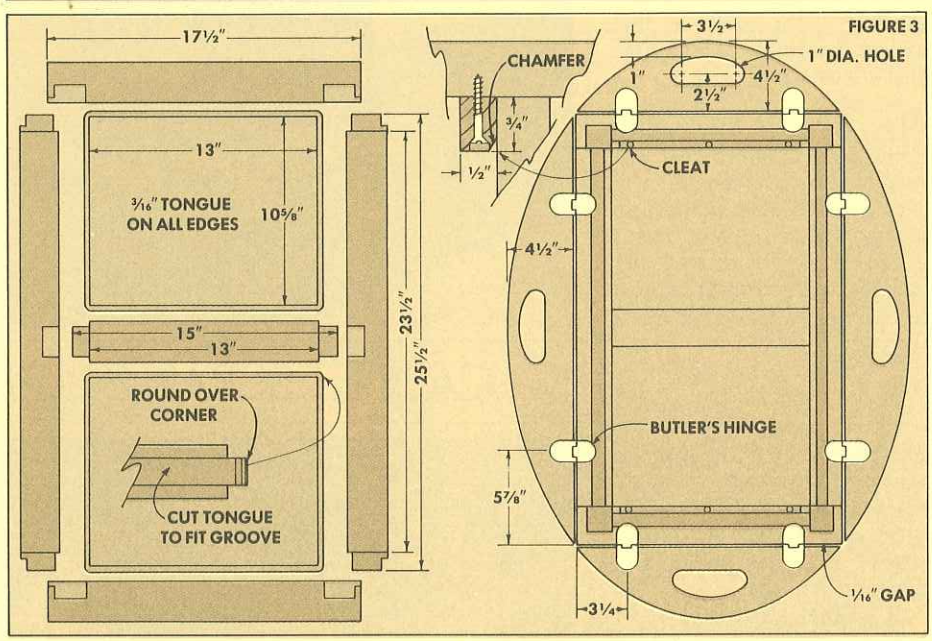
Once you've gone through all the effort to mount the hinges, remove them. (I didn't do this and ran into a lot of problems when applying the finish.)

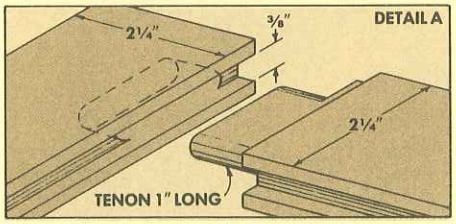
On page 9 we describe in more detail the method we used to finish this table. Basically, it involves applying several coats of sanding sealer to the entire project — base and tray. Then I varnished the tray top and rubbed it out to a satin sheen. However, because varnishing can be a lot of hassle, I chose to varnish only the tray top — not the base. In effect, putting the varnish where it was needed to protect the wood, but not bother with the base.

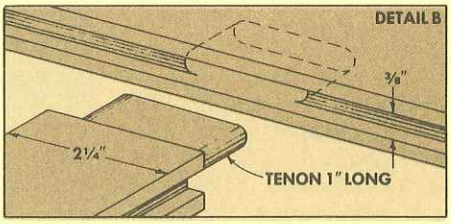
Sources: *Pliant Wood* veneer: The Woodworkers' Store, 21801 Industrial Blvd., Rogers, MN 55374; Craftsman Wood Service, 1735 W. Cortland Ct., Addison, IL 60101. (Send for their catalogs.)
Butler's Table Hinges: See page 16.







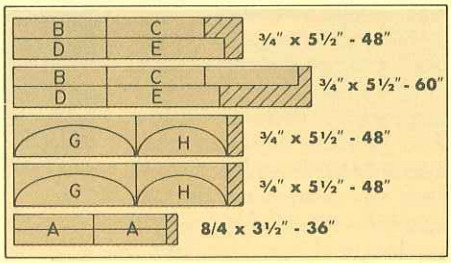




MATERIALS LIST

A	Legs	1⅝ x 1⅝ - 16¼
B	Aprons (long)	¾ x 3 - 25⅝
C	Aprons (short)	¾ x 3 - 15⅛
D	Tray Stiles	¾ x 2¼ - 25½
E	Tray Rails (end)	¾ x 2¼ - 17½
F	Tray Rail (Middle)	¾ x 2¼ - 15
G	Leaf (long)	¾ x 4½ - 28
H	Leaf (short)	¾ x 4½ - 17½
I	Inserts	¾ x 11 - 13⅜

CUTTING DIAGRAM



Tools of the Trade

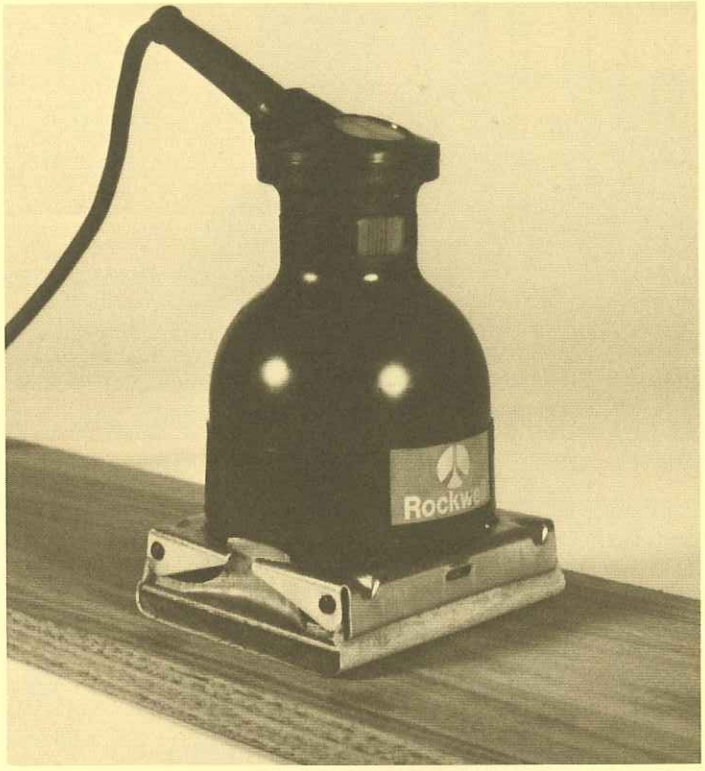
ROCKWELL SPED BLOC ORBITAL SANDER

I'm not a great fan of spending a lot of money on professional quality tools. Granted, they work faster, smoother, more accurately (in short, better) than the less expensive tools sold for home use. But they're usually not worth the extra money if you don't need to rely on them day in and day out.

There are exceptions, however. The *Rockwell Sped Bloc* Orbital Sander is a definite exception. I could probably survive without one . . . but I wouldn't want to. The *Sped Bloc* makes the chore of sanding seem easy, in fact, almost enjoyable. (And for me, that's worth any price.)

So, what's the difference between the *Sped Bloc* and the home-shop sanders that cost only one-third as much?

Most home-shop sanders are sold as "finish" sanders. Turn it on and it jiggles around very rapidly, but not much happens in the way of removing wood.



On the other hand, when I'm faced with the task of sanding out a scratch, smoothing out some milling ripples, or sanding a table top, the *Rockwell* sander gets the job done.

Not only does it get the job done, it's easy to hold, operates smoothly and efficiently, and will flush sand right up against another board.

The dome shape and light weight make it easy to maneuver. The smaller pad allows you to sand small pieces or follow the edge of a curved piece. (The pad takes one-fourth sheet of sandpaper. We use 100-grit Garnet paper 90% of the time.)

Okay, I'm sold, but what's the bottom line? The *Rockwell Sped Bloc* retails for about $75 (gulp). But you can find deals (for $10 to $20 less) in some catalogues (*U.S. General* and *Silvo Hardware*). Even at the full price (though I'd still think twice about buying it) it's worth every penny.

CABINET SCRAPER BLADE

You've got to be kidding. You mean you can take that little piece of steel and scrape(?) a good, clean surface on a piece of wood? And it's better than sanding? No way.

A cabinet scraper is one of the best finishing tools you can have in your shop. If you've ever tried to sand out saw marks you know what a drudgery that can be. The cabinet scraper wisks away saw marks leaving a crisp, square edge (not the rounded-over edge you get with sandpaper). It's also ideal for removing burn marks, milling ripples, and scratches.

There are two other advantages over sandpaper. A scraper blade costs about $5 and will last pretty near a lifetime. And, probably most important, a scraper blade leaves the grain clear and clean — not the hazy blurred surface you get with sandpaper.



Okay, there has to be a catch. There is. The scraper blade has to be "sharpened". The name scraper is a little misleading. When a scraper blade is *not* properly sharpened, all it does is scrape. You'll put forth a lot of effort and get a little bit of sawdust.

When a scraper blade is honed and burnished it should *cut* the wood producing fine shavings, much like a plane. The steps involved in doing this are diagrammed on the next page. Once you get used to burnishing the edge, you'll wonder why they ever bothered inventing sandpaper.

Cabinet scrapers are available in most woodworking catalogs (and at some hardware stores). The *Stanley* Scraper is a 3″ x 5″ and costs about $5. The *Sandvic* is about 2½″ x 6″ and costs about $6. Either one is an excellent tool. (I happen to prefer the *Stanley*.)

Sharpening a Scraper Blade

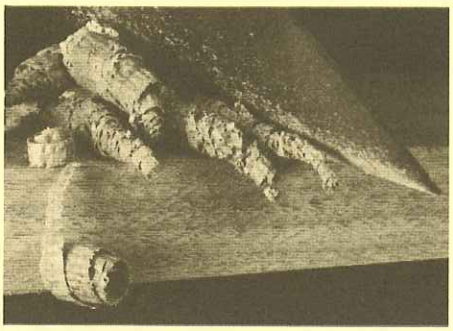
STEP-BY-STEP TO THE PERFECT FINISHING TOOL

You may be reluctant to buy and use a cabinet scraper because it's one more tool you have to sharpen. But "sharpening" in this case can be done in a couple of minutes.

Actually, sharpening is not really the proper term. What you do is square up the edge and then burnish (rub) over a small hooked edge (burr). You need three tools to accomplish this: a single-cut mill file, an oil stone (I use a Soft Arkansas stone), and a hard steel burnisher.

If you mount the scraper in a metal vice for sharpening, protect both faces with strips of soft wood. (Scratches on the face will later form nicks in the hooked edge.)

The first three steps in the sharpening process produce a good square edge on the scraper. This is accomplished by filing the edges, honing them smooth, and then removing the wire edge left after honing.

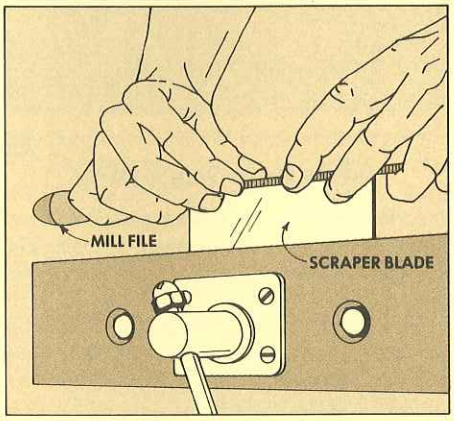


Burnishing is then done in two steps. First, the edge is drawn, then it's pushed over (burnished) to form the burr (hooked edge). You can buy a burnisher to do this, but I use a screwdriver, or you can use the back of a chisel. There should be some oil left on the scraper after honing. If not, put a drop on each edge before burnishing.

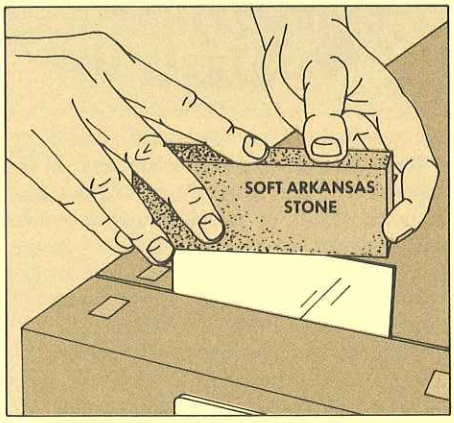
How much pressure? Apply light pressure if you use the scraper for finishing work, more pressure for rough work. (You'll get the feel of it in a short time.)

To use the scraper, tilt it about 20°, either toward you, or away from you. The first few passes may yield more dust than shavings as the scraper takes off the high spots. But very quickly you should feel it cut, as with a plane, producing very fine shavings. In the photo to the left, we've burnished the edge for very rough work to get the thick curls of shavings. This is exaggerated to give you an idea of how the scraper cuts, not scrapes.

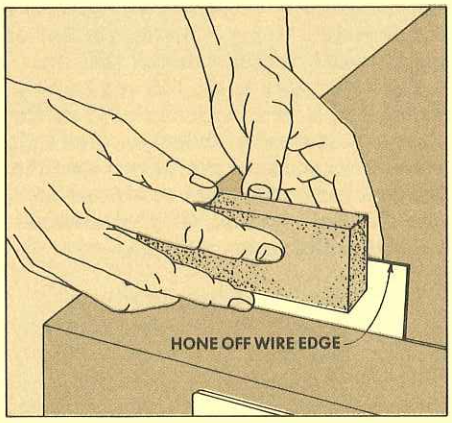
When the scraper starts to get dull, just draw a new edge and burnish it over. This can be done three or four times before you have to file and hone again.



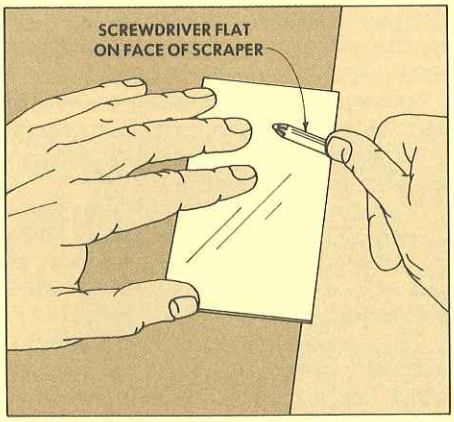
1 *Use a mill file to square the edge. I hold the file with the tips of my fingers using my middle fingers as a steady, rubbing against the face of the scraper blade.*



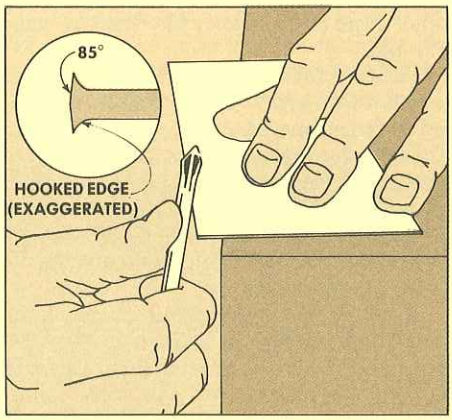
2 *Use the edge of a Soft Arkansas stone to hone the roughness left by the file. Hold the stone slightly askew. Use an even back and forth motion, without rocking.*



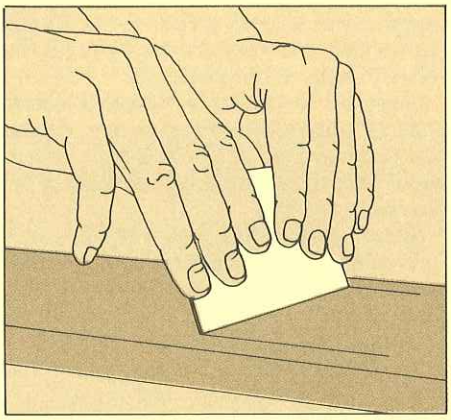
3 *After honing, the stone will leave a wire edge. This wire edge is very weak and should be removed by honing with the stone flat against the scraper's face.*



4 *The first step in burnishing is to draw an edge. Hold a burnisher, chisel, or screwdriver flat on the face of the scraper and pull along the edge three or four times.*



5 *Turn over a hooked edge by holding the burnishing tool at a slight angle (5°). Repeat three or four times until you feel the burr with the pad of your thumb.*



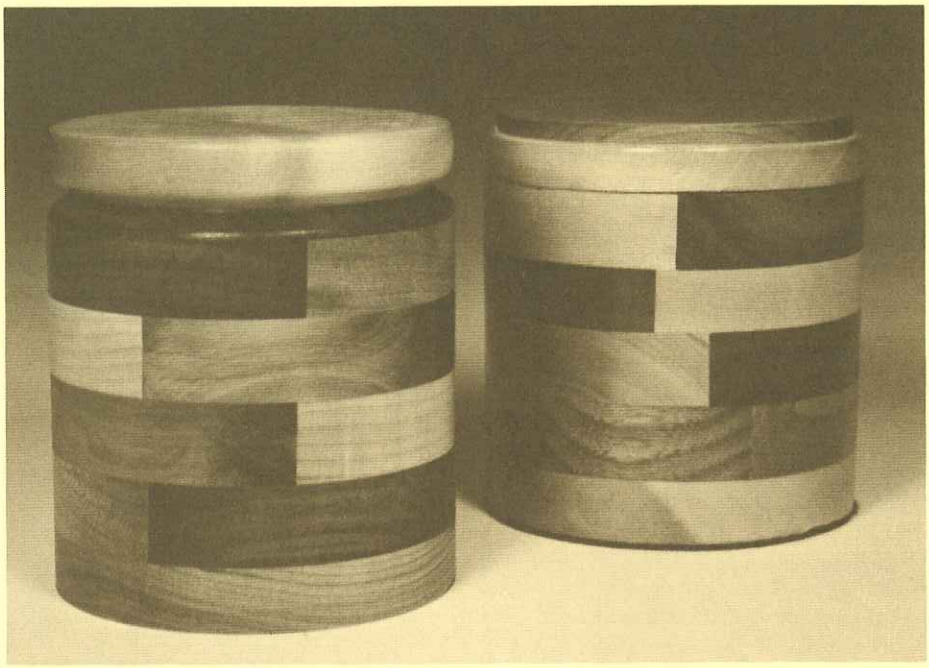
6 *In use, tilt the scraper away from you (or toward you) about 20°. Start pushing until you feel it cut. You should get very fine shavings, as with a plane.*

Turned Canister

BEAUTY FROM THE SCRAP BIN

Editor's note: The twine box (shown on the right in the photo) was designed and turned by by Wm. B. del Solar of Westmont Ill. Much of Mr. del Solar's work involves intricate and quite difficult turning techniques with exotic hardwoods (in particular, South American hardwoods imported from Peru). He, like most of us, cannot bear to part with even the smallest piece of these precious woods. Mr. del Solar designed this twine box to preserve these precious pieces — turning scrap into beauty — and has agreed to share it with us.

By Wm. B. del Solar



I'm one of those frugal woodworkers that saves every bit and piece of all the various kinds of wood I use in my work. This twine box is a nice little project where these odds and ends can be used to good advantage. I have made many of these boxes for family and friends . . . incorporating whatever scrap wood I have on hand at the time.

The dimensions of the box can be proportioned to meet a particular need (in this case, to hold a ball of twine), or altered to fit the scrap you have available at the time. The dimensions of the box shown are (more or less): height with lid, 4¾"; inside height, 3½"; outer diameter, 4¼"; and inner diameter, 3½".

If all of the bits and pieces of wood that you have on hand are the same thickness, 'building' the basic block for the box is much easier. However, pieces of different thicknesses can be used if you true each layer before the next layer is added. These pieces do not have to fill the whole block. They only need to be wide enough to cover the concentric circles that will be the inside and outside of the box. You can use four pieces cut at 45°, six pieces cut at 15°, or any number you want provided you cut the correct angle so the pieces fit.

Start by mounting a ¾"-thick waste block (auxiliary face plate) to one of your face plates and true it up. This will serve to paper glue the solid bottom of the box for face plate turning.

Spread glue on the waste block, add a piece of heavy paper (or thin poster board) and then glue the bottom to the paper. The first layer of mitered pieces is then cut, fit and glued to the solid bottom piece.

To do this, place a piece of paper and another piece of scrap wood on top and clamp this layer against the tail stock. After this layer is dry, continue adding layers in the same manner until you get the height wanted. Be sure to true each layer before adding the next.

Now, when this block is dry, cut off the corners by hand to facilitate the turning. Turn the block to rough shape at a slow speed (about 860) using a 1" or ¾" gouge. Do the final turning at the next higher speed (about 1725) using a very sharp ½" gouge or very sharp ½" skew.

Turn the inside of the box to rough shape using a round nose scraper. Then use a parting tool to get the inside straight and true. Finally, use the parting tool to cut a shoulder on the inside rim of the box.

The lid is turned from another single piece of wood, or from one made of several pieces, depending on how much work you want to do or how fancy you want to make the box.

Paper glue the piece for the top to another face plate. Turn a shoulder on the lid to fit the shoulder that you have cut on the box. As you're cutting the shoulder on the lid, be very careful to get a good tight fit with the 'female' rim on the box. Stop the lathe frequently and check the fit. When this shoulder fits, separate the lid from the face plate.

Remount the box portion on the lathe and friction fit the lid to the box. Turn the outside of the joined box and lid to a smooth surface. Then bore a 1/16" hole in the center of the lid for the twine.

Thoroughly sand the box and lid and finish the box to your liking. For this box I used French polish, but *Deft* Clear Wood finish would be very appropriate.

NOTES FROM WOODSMITH

Mr. del Solar's twine box inspired us to put some of our own scrap wood to use. The canister on the left in the photo is our version of his twine box.

To make our version, we glued up four-sided 'frames', each side a different wood (cherry, walnut, maple and gum). We found it a little bit faster to glue up the four frames we needed as shown in Figure 2. Then each frame was cut (with a sabre saw) to a very rough donut shape.

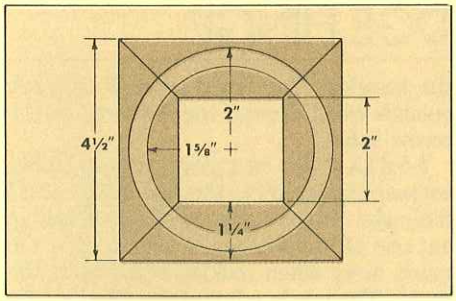
The basic procedure we followed was the same as del Solar described, with one exception. We used a skew to smooth down the inside of the canister, and a square-nose scraper to smooth the bottom.

As we turned the lid, we beveled the lip just slightly, still making a tight friction fit with the shoulder of the canister. Then, we cut a small finger cove in the lid.

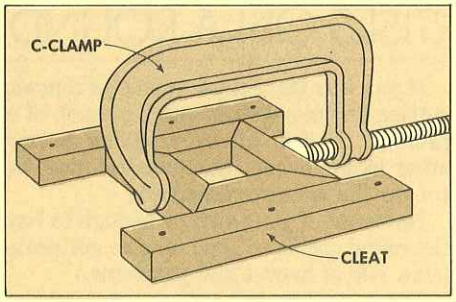
We wanted to keep the finish as natural as possible, so we applied a coat of *Watco* oil. After allowing it to dry three days, we put on a wash coat of 1½ lb.-cut white shellac just to give it a little gloss.

What makes this canister so nice is the simplicity of design. Whenever someone walks into my office and sees this twine box, they ask about the various kinds of wood that were used to make it. That's a tribute to the design — you don't have to trip over the turning in order to see the beauty of the wood.

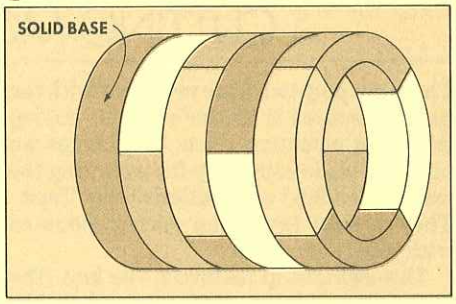
Step by Step



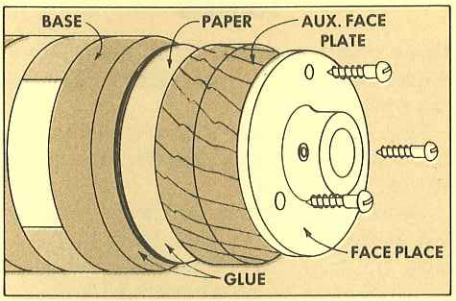
1 *Cut four mitered pieces 4½" long and 1¼" wide to make 'frame.' For larger canisters, you may want to switch to six-sided or eight-sided frames for less waste.*



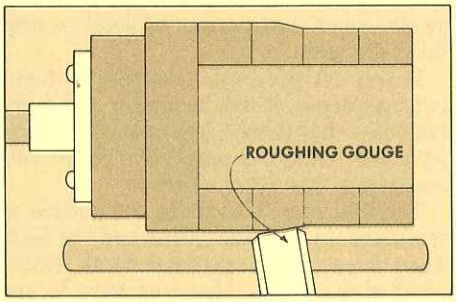
2 *An easy way to glue the frames: nail two cleats exactly 4½" apart. Apply glue to the mitered frame and clamp it together with a single C-clamp.*



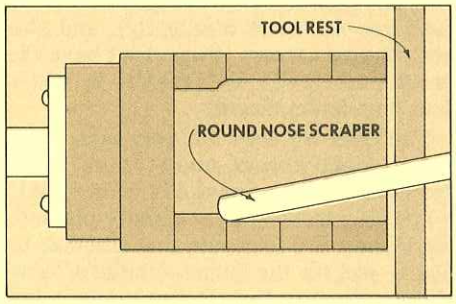
3 *Cut the frames to rough circles with a sabre saw. Make sure they are planed to the same thickness. Then glue them to the solid base, alternating the joint lines.*



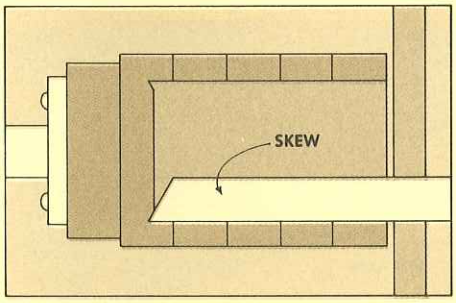
4 *Screw a waste block to a face plate. Then spread glue on the waste block, add heavy paper, then more glue, and finally the base. Clamp layers together.*



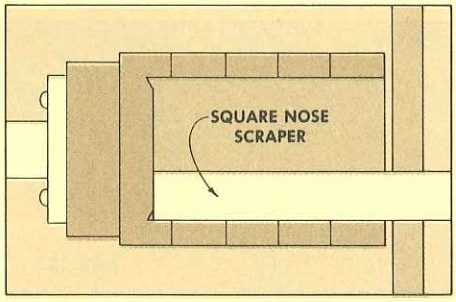
5 *Rough down the basic shape of the outside of the canister with a 1" or ¾" roughing gouge. Be sure to allow enough thickness for the inside to be turned.*



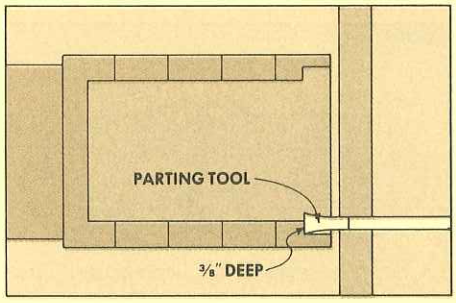
6 *Use a round-nose scraper to rough down inside walls of canister, and carve out the bottom. This will leave a round corner where bottom meets the wall.*



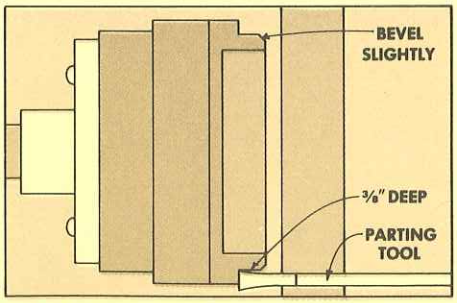
7 *We used a skew to smooth the inside of the canister and square off the bottom corner. When using the skew, make sure the handle is higher than the cutting point.*



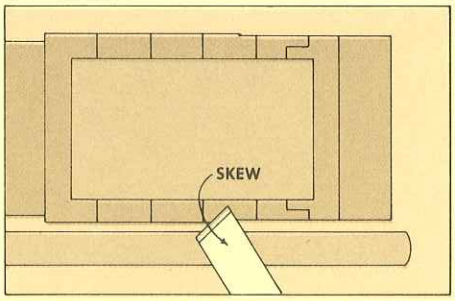
8 *A square nose scraper is used to smooth the bottom of the canister. Be careful as you move the scraper toward the center so it doesn't catch on the "upside."*



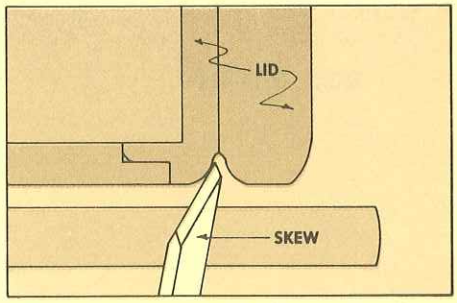
9 *The final step is to cut a shoulder on the inside edge of the canister. This was done with a parting tool, making the shoulder half the thickness of the wall.*



10 *Paper glue the lid to a face plate. Turn a hollow on the inside of the lid, and cut a beveled shoulder to fit in the canister. Stop lathe often to check fit.*



11 *Return the base part of the canister to the lathe and friction fit the lid in place. Smooth canister with a skew. If lid is loose, add masking tape to shoulder.*



12 *Rest pointed end of skew on tool rest to cut finger cove in the lid. Then sand the inside and outside of canister (but not the shoulders). Finish as desired.*

Butler's Table Hinges

CUTTING MORTISES ON A ROUND-EDGE HINGE

There are only two little problems with the hinges used on a Butler's Table: buying them and mounting them. The hinges we used are made especially for mounting the leaves (handles) of a Butler's Tray Table. They're solid brass and spring mounted with a 90° swing/stop.

This swing/stop feature is the key. The hinges are designed to stop when the leaves are moved to the upright (90°) position. (Regular hinges would allow the leaf to flop over on the tray.)

These hinges come in two styles: with rounded ends as shown in Fig. 1 (this is the kind you see most frequently), and also with square corners (these don't have the traditional 'look', but they're a whole bunch easier to mount).

The ones we used are very nice: solid brass, round corner, and (I think) hand formed, but they cost $11.25 per pair when this issue was originally printed. Since there are four pair, that amounts to $45 — just for the hinges. (Butler's Table Hinges do vary in price so contact the sources listed below.)

And now for the bad news. Just when your hand stops shaking from writing the check for the hinges, you're faced with the delicate task of mounting them.

If you buy the square cornered hinges, cutting the mortises is not too much of a problem. In fact it's very similar to any other hinge, except that notches must be cut for the spring mechanism.

However, if you're crazy enough to buy the round cornered type, you've got problems. (Or at least I had problems.)

There are two ways to go about cutting the mortises: by hand, or with a router. Since there are eight mortises to cut, I thought I'd save time by routing out the initial shape with a router, then chiseling out the rest. This, of course, takes a very gentle touch and nerves of steel — one little slip and

If you cut the initial mortise by hand (with a gouge), it will be slower and more tedious — but there's less chance of a major error. (And I'm sure your butler will appreciate this extra effort.)

The first step is to mark the outline of the hinge on the web frame and the leaf. Then chisel (or route) to the depth (thickness) of the hinge. Now you have to get into what looks like Japanese joinery. Figure 1 shows the bottom of the hinge with the spring and the V-shaped knuckle.

You have to cut a notch for the spring assembly, and then cut an angled notch for the knuckle. The tricky part is to leave enough wood around the notches for the screw holes.

I did all of this on a piece of scrap before committing myself to the real thing. And I did make one bad slip. As I was chiseling out one of the notches, I used a little too much force when making a cut with the grain. The whole edge of the handle split off and I had to start over and make a new one. Moral: Make firm cuts when the chisel is *across* the grain, and gentle ones when the chisel is *with* the grain.

SOURCES

Three catalogs that offer Butler's Table Hinges are listed below. Contact them for more information.

The Woodworker's Store. Address: 21801 Industrial Blvd., Rogers, MN 55374. Tel: (612) 428-2199.

Woodcraft. Address: 210 Wood County Industrial Park, P.O. Box 1686, Parkersburg, WV 26102-1686. Tel: (800) 225-1153.

Craftsman Wood Service Company. Address: 1735 W. Cortland Ct., Addison, IL 60101. Tel: (800) 543-9367.

FIGURE 1

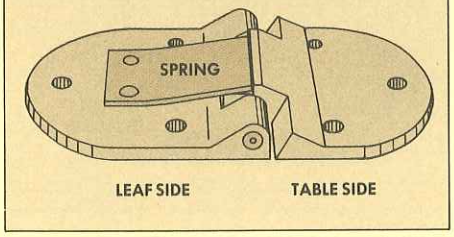


FIGURE 2

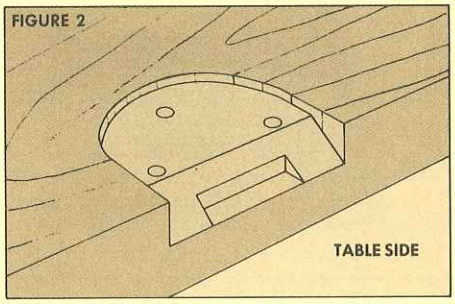
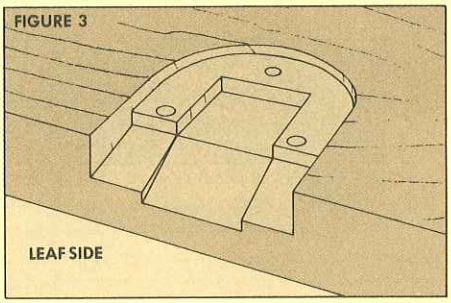


FIGURE 3



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